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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/379,753	08/24/1999	MICHAEL N. GRIMBERGEN	3948/USA/SIL	1675

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APPLIED MATERIALS INC
PATENT DEPARTMENT
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EXAMINER
ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
1763	17

DATE MAILED: 03/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

A 9-17

Offic Action Summary

Application No.	Applicant(s)
09/379,753	GRIMBERGEN,MICHAEL N.
Examiner	**Art Unit**
Rudy Zervigon	1763

-- The MAILING DATE of this communication app ars on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Nov 5, 2001*

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-4, 6-30, 33-42, and 44-59* is/are pending in the applica

4a) Of the above, claim(s) *15-22 and 52-56* is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-4, 6-14, 23-30, 33-42, 44-51, and 57-59* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 23-29 is withdrawn in view of the newly discovered references to Giapis et al (USPat. 5,002,631), Ish-Shalom et al (USPat. 6,299,346), Taketora Saka (JP01260304), and Kubota et al (JP60-12732). Rejections based on the newly cited references follow.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 30, 33-35, 38, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Giapis et al (USPat. 5,002,631). Giapis teaches a substrate processing apparatus (Figure 1; col. 3, lines 9-21) comprising a chamber (100) capable of processing a substrate ("workpiece"; column 3, lines 9-21) and a radiation source (162). Giapis further teaches a sample detector (164 or 165) to detect a reflected radiation from the substrate (120) or a chamber wall and generate a sample signal (column 4, lines 40-49). Giapis further teaches a reference detector (163) to detect a reference radiation (from 162) from the radiation source (162) and generate a reference signal (column 4, lines 40-49). Giapis further teaches one or more first fibers (from laser 162 to bundle 166) to transmit the reference radiation from the radiation source (162) to the reference detector (163) and one or more second fibers (166) to transmit the reflected radiation from the chamber.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. Claims 40-51, and 57-59 are rejected under 35 U.S.C. 102(e) as being anticipated by Ish-Shalom et al (USPat. 6,299,346). Ish-Shalom teaches fiber optic (24, Fig.2a) spectroscopy of a wafer (10). Ish-Shalom additionally teaches a chamber (14) comprising an electro-optical shutter (23) modulated (column 10, lines 40-45) radiation source (28), first (32) and second (34) detectors for detecting an intensity of a first radiation reflected (column 9, lines 20-39) from a substrate and the detection of an intensity of a second radiation from the radiation source. Specifically, Ish-Shalom teaches a feedback controller (36) adapted to regulate a power level (column 11, lines 8-15) of a reference radiation (28).

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-4, 6, 11-14, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giapis et al (USPat. 5,002,631) in view of Taketora Saka (JP01260304). Giapis teaches a substrate processing apparatus (Figure 1; col. 3, lines 9-21) comprising a chamber (100) and radiation sources (161, 162). Giapis further teaches one or more detectors (164, 165) to detect an intensity of a first radiation originating from the radiation source(s) and reflected from a substrate (120) or a chamber wall and generate a sample signal (column 4, lines 40-49). Giapis further teaches the detection (163) of an intensity of a second radiation (162) emitted from the radiation source and generate a reference signal (column 4, lines 40-49) at the second detector (163). Giapis further teaches the uniformity of wavelength between the first radiation reflected from the substrate and the second radiation (from the source 162) as per the "bifurcated fiber bundle 166" detected by one monochrometer detector 163. Giapis teaches a substrate processing apparatus as described above. However, Giapis does not teach a lens to focus the reference radiation from the radiation source onto the first fibers. Taketora Saka shows a lens (6) in Taketora Saka's Figure focusing radiation between the reference radiation (3) and the substrate (1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement Taketora Saka's use of the lens to focus the reference radiation from the radiation source onto the first fibers.

Motivation for implementing Taketora Saka's use of the lens to focus the reference radiation from the radiation source onto the first fibers is drawn to the level of ordinary skill in the art whereby lens optics are known to focus, i.e. concentrate, light rays thereby increasing the radiation's intensity to a small area.

Giapis does not teach a signal analyzer adapted to normalize the sample signal relative to the reference signal to generate a normalized signal, and determine a thickness of a layer on the substrate or chamber wall from the normalized signal.

Taketora Saka teaches a film thickness signal analyzer ("calculating"; Constitution) adapted to normalize ("..by calculating the ratio of the intensity") the sample signal relative to the reference signal to generate a normalized signal, and determine a thickness (Purpose) of a layer on the substrate or chamber wall from the normalized signal.

It would have been obvious to one of ordinary skill in the art to implement the film thickness signal analyzer of Taketora Saka as part of the Giapis structure for collecting the reflected and reference radiations.

Motivation for implementing the film thickness signal analyzer of Taketora Saka as part of the Giapis structure for collecting the reflected and reference radiations is drawn to the benefits gained

by Taketora Saka of measuring film thickness. Giapis additionally supports the importance of measuring film thicknesses by identifying such related parameters as "etching rate, uniformity and etching endpoint" (column 4, lines 45-50).

8. Claims 7-10, 23-29, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giapis et al (USPat. 5,002,631) in view of Taketora Saka (JP01260304), as applied to claims 1-4, 6, 11-14, and 36 above, and further in view of Kubota et al (JP60-12732). Both Giapis and Taketora Saka do not teach a signal analyzer that is adapted to determine a corrected sample signal by applying a correction factor to the normalized signal. Kubota teaches a similar radiation analyzing and processing apparatus (sole Figure, Constitution). Specifically, Kubota teaches the processing and manipulation of reflected and reference signals ("standard light source"; Constitution) generated from the light collected from both detectors (12,14). The signals are "inputted in a calculation equipment 16 through an A/D converted 15 and is compared with each other. In the equipment 16, an appropriate exposure quantity for the reflected factor of the wafer 1 is calculated depending on the compared results and the previously obtained data."

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement the Kubota "equipment 16" as part of the Taketora Saka apparatus to determine a corrected sample signal by applying a correction factor to the normalized signal.

Motivation for implementing the Kubota "equipment 16" as part of the Taketora Saka apparatus to determine a corrected sample signal by applying a correction factor to the normalized signal is drawn to the Kubota desire to "enable an optimum pattern exposure" by "detecting reflection factor of the photoresist film on the surface of a wafer and setting optimum exposure quantity calculated on the detection results." (Purpose).

Response to Arguments

9. Applicant's arguments with respect to all pending claims have been considered but are moot in view of the new grounds of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

GREGORY MILLS
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